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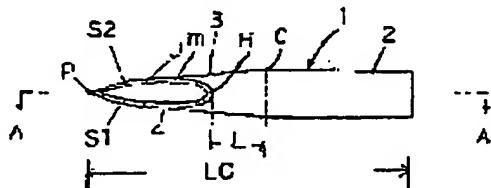
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## (54) BLOOD TAKING NEEDLE

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To facilitate pricking of a needle to the blood vessel so as to lessen the pain incurred on a blood donor, to make the incision wound of the blood vessel small, to expedite the restoration of damage to the blood vessel tissues and to increase the inflow rate of the blood by forming a main bevel and side bevels at the front end of a small-diameter tube stock and arranging the rear end of the main bevel on the small-diameter tube stock.

**SOLUTION:** This blood taking needle 1 is composed of the tube stock 2 and the small-diameter tube stock 3 formed in front of the tube stock 2. A blade surface 4 consisting of the main bevel (m) and the side bevels S1, S2 is formed on the front end of the stuck stock 3 of the diameter smaller than the outside diameter of the tube stock 2. The rear edge H of the blade surface 4 is arranged on the small-diameter tube stock 3. The blood taking needle 1 is produced by grinding the front end of the small-diameter tube stock 3 formed by drawing the front end of the tube stock 2 to a conical shape to form the main bevel (m) and in succession, grinding the front end of the main bevel (m), thereby forming the side bevels S1, S2. Then, the incision width of the blood vessel by the blade surface 4 at the time of pricking the blood vessel is made smaller than the outside diameter of the tube stock 2.



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**CLAIMS****[Claim(s)]**

[Claim 1] The blood collecting needle 1 characterized by having consisted of narrow diameter element tubes 3 (13) formed ahead of the element tube 2 (12) which has an outer diameter D0, and this element tube 2 (12), having formed the Maine bevel m and the side bevels S1 and S2 in the point of the narrow diameter element tube 3 (13), and having arranged the trailing edge H of the Maine bevel m on the narrow diameter element tube 3 (13) (11).

[Claim 2] The Maine bevel m, the side bevel S1, the blood collecting needle 1 according to claim 1 characterized by forming the rate of height DJ of the drainage divide J formed among S2 to  $DJ/DB \times 100 \leq 50\%$  to the overall height DB of m.

[Translation done.]

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## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

## [0001]

[Field of the Invention] This invention relates to the blood collecting needle in the case of collecting blood from a body peripheral vein and an artery with a medical supply.

## [0002]

[Description of the Prior Art] As shown in drawing 10 ( drawing 11 is the D-D sectional view of drawing 10 ), after the conventional blood collecting needle 31 carries out grinding of the element tube 32 which has a fixed outer diameter to a predetermined include angle and forms the Maine bevel m, change a grinding include angle, a circumferencial direction is made to carry out predetermined include-angle rotation of the element tube 32, grinding formation of one side bevel S1 is carried out, the above-mentioned include angle carries out the amount reversal of 2 double of the element tube 32 again, and it carries out grinding formation of the side bevel S2 of another side. as there was no constraint special about the location on the Maine bevel m of the drainage divide J formed from the Maine bevel m and the side bevels S1 and S2 and the angiotomy width of face by the blood vessel puncture was shown in drawing 12 , the element tube 32 was made until outer-diameter full.

[0003] More little damage on a blood vessel is wanted for the needle used when extracting the blood for transfusion or the blood as a blood product raw material from a body peripheral vessel, and when [ in order to carry out extracorporeal circulation of the blood in blood purification therapies artificial dialysis and various / other /, ] collecting blood using a peripheral vessel and carrying out the re-transfusion of the blood after purification to have little pain with which blood vessel puncture resistance runs through smoothly few and which it gives to a blood collecting person, and for there to be many amounts of blood collecting per unit time amount, and for there to be. Since the blood for transfusion in our country or the blood as a blood product raw material is offered gratuitously from a well-intentioned donor, pain given to the donor accompanying blood collecting actuation should be made the minimum. Moreover, it is very important for an extracorporeal circulation blood purification therapy on a therapy action that vascular injury is the minimum so that promptly [ a short period of time / there may be much \*\*\*\* crack \*\*\*\* and / damage restoration of a patient's blood vessel blood collecting part ]. The conventional blood collecting needle 31 did not have enough consideration of this point. Then, the pain of this invention given to a blood collecting person that it is easy to run through a blood vessel is small, the angiotomy blemish accompanying \*\*\* is small, and restoration of blood vessel tissue damage is quick, and aims at offer of a blood collecting needle with a large blood inflow.

## [0004]

## [Means for Solving the Problem]

[1] It consists of narrow diameter element tubes 3 (13) formed ahead of the element tube 2 (12) which has an outer diameter D0, and this element tube 2 (12), form the Maine bevel m and the side bevels S1 and S2 in the point of the narrow diameter element tube 3 (13), and offer the blood collecting needle 1 (11) which has arranged the trailing edge H of the Maine bevel m on the narrow diameter element tube 3 (13).

[2] Offer the Maine bevel m, the side bevel S1, and the blood collecting needle 1 of [1] which formed the rate of height DJ of the drainage divide J formed among S2 to  $DJ/DB \times 100 \leq 50\%$  to the overall height DB of m.

[0005]

[Embodiment of the Invention] Drawing 1 is the top view ( drawing 2 is the A-A sectional view of drawing 1 ) of the blood collecting needle 1 of this invention, and the blood collecting needle 1 consists of narrow diameter element tubes 3 formed ahead of the element tube 2 and the element tube 2, from the outer diameter D0 of an element tube 2, it forms the blade surface 4 which consists of a Maine bevel m and side bevels S1 and S2 at the tip of the narrow diameter element tube 3, and arranges the trailing edge H of a blade surface 4 on the narrow diameter element tube 3. The blood collecting needle 1 is manufactured by carrying out grinding of the tip of the narrow diameter element tube 3 by which spinning was carried out to the shape of a cone in the tip of an element tube 2 as shown in drawing 3 , forming the Maine bevel m, continuing, carrying out grinding of the tip of the Maine bevel m, and forming the side bevels S1 and S2.

[0006] Drawing 4 is the top view ( drawing 5 is the B-B sectional view of drawing 4 ) of the blood collecting needle 11 of this invention, and the blood collecting needle 11 consists of narrow diameter element tubes 13 formed ahead of the element tube 12 and the element tube 12, forms the blade surface 14 which consists of a Maine bevel m and side bevels S1 and S2 at the tip of the narrow diameter element tube 13, and arranges the trailing edge H of a blade surface 14 on the narrow diameter element tube 13. The blood collecting needle 11 is manufactured by forming the Maine bevel m, carrying out grinding of the tip of the narrow diameter element tube 13 pulled down and processed, carrying out grinding of the tip of the Maine bevel m continuously, and forming the side bevels S1 and S2, holding the inclination stage T so that it may become thinner than the outer diameter D0 of an element tube 12, as shown in drawing 6 . The blood collecting needles 1 and 11 can make angiomy width of face by the blade surfaces 4 and 14 at the time of a blood vessel puncture smaller than the outer diameter of element tubes 2 and 12 as mentioned above.

[0007] It is better to make it  $L > 0$  (configuration with which H and C do not lap), since \*\*\*\* resistance becomes large so that it may mention later in  $L = 0$  (configuration with which H and C lap) although the blood collecting needles 1 and 11 of this invention can set the trailing edge H of the Maine bevel m, and the distance L between the inclination start points C of element tubes 2 and 12 (the outer diameter of C location is the same as the outer diameter D0 of element tubes 2 and 12) as arbitration. The \*\*\*\* resistance of the blood collecting needle 21 (the example 1 of a comparison, ( $L = 0$ , the configuration where H and C lapped)) of drawing 7 ( drawing 8 is the C-C sectional view of drawing 7 ), and the conventional blood collecting needle 31 (example 2 of a comparison) was measured in the blood collecting needle 11 (example 1) list of this invention. The result is shown in Table 1 ( drawing 9 is drawing which graph-ized each data of an example 1 and the examples 1 and 2 of a comparison). It has checked that the blood collecting needle 11 of this invention had \*\*\*\* resistance lower than the result of Table 1 ( drawing 9 ) on the whole as compared with the blood collecting needles 21 and 31 of the examples 1 and 2 of a comparison.

[0008]

[Table 1]

## 刺通抵抗値（採血針）

刺通抵抗値 (g)	刃先 P	分水嶺 J	mの後 縁 H	傾斜開始 点 C	素管部	採血針刃の形状	
						刃外径 mm	素管外径 mm
実施例1 (本発明 の採血針11)	36.8	83.6	79.4	17.4	17.4	1.40	1.69
比較例1 (刃後縁 部が傾斜開始点と重 なる採血針21)	42.4	91.8	141.4	141.4	20.6	1.40	1.69
比較例2 (従来の 採血針31)	32.0	111.8	104.2	14.8	14.8	1.69	1.69

(注) PVCシート（厚さ0.4ミリ；血管壁として想定）5か所穿刺の平均抵抗値 (g)

第9図にグラフ図を示す

[0009] Moreover, as mentioned above, it has checked that it was better for the blood collecting needle 21 (example 1 of a comparison) of  $L=0$  (configuration where H and C lapped) to have become quite larger than the example 2 of a comparison, and for the \*\*\*\* resistance of H (C) to set it to  $L > 0$  (configuration with which H and C do not lap) from this. Moreover, the relation between (DJ/DB<sub>x</sub>100) and \*\*\*\* resistance was shown for the rate of height to the overall height DB (height from the cutting-edge tip P to H) of the Maine bevel m of height DJ (height from the cutting-edge tip P to J) of the drainage divide J formed of the Maine bevel m and the side bevels S1 and S2 of the blood collecting needle 1 of this invention in Table 2. DJ/DB<sub>x</sub>100 are understood are good to form to 50% or less from the result of Table 2.

[0010]

[Table 2]

## 刺通抵抗値（採血針）と分水嶺（J）の高さ（DJ）との関係

刺通抵抗値 (g)		刃先 P	分水嶺 J	mの後縁 H	素管部
	Jの高さ (%)				
実施例2 (採血針1)	57	88	243	135	25
実施例3 (採血針1)	31	63	122	126	24
実施例4 (採血針1)	22	72	93	147	23

(注) 採血針外径1.65ミリ

PVCシート（厚さ0.4ミリ；血管壁として想定）5か所穿刺の平均抵抗値 (g)

[0011] Moreover, with the blood collecting needle 1 of this invention (11), it has checked that blood inflow (blood collecting rate per unit time amount) was fully securable also in [ it is satisfactory in fluid study and ] clinical actual condition by forming L in 1/20 from 1/10 of the

whole needle length L0.

[0012]

[Effect of the Invention] Since incision \*\*\*\* of a blood vessel is also small while being able to suppress small the pain given to a blood collecting person that it is easy to carry out a puncture and also fully being able to secure a blood collecting rate, the restoration of an incision blemish of the blood collecting needle of this invention is also quick.

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## DESCRIPTION OF DRAWINGS

## [Brief Description of the Drawings]

[Drawing 1] The top view of the blood collecting needle of this invention

[Drawing 2] The A-A sectional view of drawing 1

[Drawing 3] The schematic diagram of the element tube before processing it into the blood collecting needle of drawing 1

[Drawing 4] The top view of the blood collecting needle of this invention

[Drawing 5] The B-B sectional view of drawing 4

[Drawing 6] The schematic diagram of the element tube before processing it into the blood collecting needle of drawing 4

[Drawing 7] The top view of the blood collecting needle of the example 1 of a comparison

[Drawing 8] The C-C sectional view of drawing 7

[Drawing 9] The graph which shows the \*\*\*\* resistance of each blood collecting needle

[Drawing 10] The top view of the conventional blood collecting needle

[Drawing 11] The D-D sectional view of drawing 10

[Drawing 12] The schematic diagram of the incision blemish of a blood vessel with the conventional blood collecting needle

## [Description of Notations]

1, 11, 21, 31 Blood collecting needle

2, 12, 32 Element tube

3 13 Narrow diameter element tube

4 14 Blade surface

D0 Outer diameter of an element tube

D1 Outer diameter of the point of an element tube

D2, D3 Path of the narrow diameter element tube of the location of H

S (S1, S2) Side bevel

m Maine bevel

J The drainage divide formed from S and m

T Inclination stage

H The trailing edge of m

C Inclination start point

L Distance between C and H

L0 The whole needle length

DJ Height of J (height from P to J)

DB Overall height of m (height from P to m)

P Cutting-edge tip

[Translation done.]

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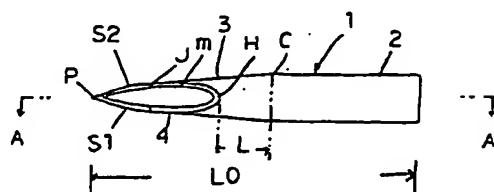
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(54)【発明の名称】採血針

(57)【要約】

【課題】穿刺しやすく採血者に与える苦痛を小さく抑え  
ることができ、採血速度も充分に確保できるとともに血  
管の切開傷幅も小さい採血針を提供すること。

【解決手段】外径D0を有する素管2(12)と該素管  
2(12)の前方に形成された細径の素管3(13)より構成され、細径の素管3(13)の先端部にメインペ  
ベルmとサイドペベルS1、S2を形成し、メインペベ  
ルmの後縁Hを細径の素管3(13)上に配置した採血  
針1(11)。



## 〔特許請求の範囲〕

〔請求項1〕 外径D0を有する素管2(12)と該素管2(12)の前方に形成された細径の素管3(13)より構成され、細径の素管3(13)の先端部にメインペベルmとサイドペベルS1、S2を形成し、メインペベルmの後縁Hを細径の素管3(13)上に配置したことを特徴とする採血針1(11)。

〔請求項2〕 メインペベルmとサイドペベルS1、S2間に形成される分水嶺Jの高さDJの割合をmの全高DBに対して $DJ/DB \times 100 \leq 50\%$ に形成したことを特徴とする請求項1記載の採血針1。

## 〔発明の詳細な説明〕

## 〔0001〕

〔発明の属する技術分野〕 本発明は医療用具にて人体末梢静脈、動脈より採血する場合の採血針に関する。

## 〔0002〕

〔従来の技術及び発明が解決しようとする課題〕 従来の採血針31は図10(図11は図10のD-D断面図)に示すように一定の外径を有する素管32を所定角度に研削してメインペベルmを形成した後、研削角度を変更し素管32を円周方向に所定角度回転させて一方のサイドペベルS1を研削形成し、再び素管32を上記角度の2倍量反転させて他方のサイドペベルS2を研削形成する。メインペベルmとサイドペベルS1、S2より形成される分水嶺Jのメインペベルm上での位置については特別の制約は無く、また血管穿刺による血管切開幅は図12に示すように素管32の外径一杯までなされた。

〔0003〕 輪血用血液あるいは血液製剤原料としての血液を人体末梢血管より採取する場合、また人工透析その他各種血液浄化療法において血液を体外循環させるため末梢血管を利用して採血し浄化後の血液を再輸注する場合に用いる針は血管穿刺抵抗が少なく円滑に刺通し、採血者に与える苦痛が少なく、単位時間当たり採血量が多く、かつ血管の損傷がより少ないことが望まれる。我が国における輪血用血液あるいは血液製剤原料としての血液は善意の献血者から無償で提供されるものであるので採血操作に伴う献血者に与える苦痛は極小とすべきである。また体外循環血液浄化療法は短期間に頻回行われることが多く患者の血管採血部位の損傷修復が速やかであるよう、血管損傷が極小であることは治療行為上極めて重要である。従来の採血針31はこの点の配慮が十分でなかった。そこで本発明は血管に刺通しやすく採血者に与える苦痛が小さく、刺通に伴う血管切開傷が小さく血管組織損傷の修復が速く、血液流入量が大きい採血針の提供を目的としたものである。

## 〔0004〕

## 〔課題を解決するための手段〕

〔1〕 外径D0を有する素管2(12)と該素管2(12)の前方に形成された細径の素管3(13)より構成され、細径の素管3(13)の先端部にメインペベルm

とサイドペベルS1、S2を形成し、メインペベルmの後縁Hを細径の素管3(13)上に配置した採血針1(11)を提供する。

〔2〕 メインペベルmとサイドペベルS1、S2間に形成される分水嶺Jの高さDJの割合をmの全高DBに対して $DJ/DB \times 100 \leq 50\%$ に形成した〔1〕の採血針1を提供する。

## 〔0005〕

〔発明の実施の形態〕 図1は本発明の採血針1の平面図(図2は図1のA-A断面図)で、採血針1は素管2と素管2の前方に形成された細径の素管3より構成され、素管2の外径D0より細径の素管3の先端にメインペベルmとサイドペベルS1、S2からなる刃面4を形成し、刃面4の後縁Hを細径の素管3上に配置したものである。採血針1は図3に示すように素管2の先端を円錐状に絞り加工された細径の素管3の先端を研削してメインペベルmを形成し続いてメインペベルmの先端を研削してサイドペベルS1、S2を形成することにより製造される。

〔0006〕 図4は本発明の採血針11の平面図(図5は図4のB-B断面図)で、採血針11は素管12と素管12の前方に形成された細径の素管13より構成され、細径の素管13の先端にメインペベルmとサイドペベルS1、S2からなる刃面14を形成し、刃面14の後縁Hを細径の素管13上に配置したものである。採血針11は図6に示すように素管12の外径D0より細くなるように傾斜段Tを保持しながら引き落とし加工された細径の素管13の先端を研削してメインペベルmを形成し、続いてメインペベルmの先端を研削してサイドペベルS1、S2を形成することにより製造される。以上のように採血針1、11は血管穿刺時の刃面4、14による血管切開幅は素管2、12の外径より小さくすることができる。

〔0007〕 本発明の採血針1、11はメインペベルmの後縁Hと素管2、12の傾斜開始点C(C位置の外径は素管2、12の外径D0と同じ)間の距離Lは任意に設定することができるが、 $L=0$ (HとCが重なる形状)では後述するように刺通抵抗値が大きくなるので、 $L>0$ (HとCが重ならない形状)にしたほうが良い。

〔0008〕 本発明の採血針11(実施例1)並びに図7(図8は図7のC-C断面図)の採血針21(比較例1、(L=0、HとCが重なった形状))及び従来の採血針31(比較例2)の刺通抵抗値を測定した。その結果を表1(図9は実施例1、比較例1、2の各データをグラフ化した図である)に示す。表1(図9)の結果より本発明の採血針11は比較例1、2の採血針21、31と比較して総体的に刺通抵抗値が低いことが確認できた。

## 〔0008〕

## 〔表1〕

刺通抵抗値(採血針)

刺通抵抗値(g)	刃先P	分水嶺J	mの後縁H	傾斜開始点C	糸管部	採血針刃の形状	
						刃外径mm	糸管外径mm
実施例1(本発明の採血針1)	36.8	63.6	79.4	17.4	17.4	1.40	1.69
比較例1(刃後縁部が傾斜開始点と重なる採血針2)	42.4	91.8	141.4	141.4	20.6	1.40	1.69
比較例2(従来の採血針3)	32.0	111.8	104.2	14.8	14.8	1.69	1.69

(注) PVCシート(厚さ0.4ミリ;血管壁として想定)5か所穿刺の平均抵抗値(g)

第9図にグラフ図を示す

[0009] また前述したように $l=0$  (HとCが重なった形状)の採血針2 (比較例1)はH (C)の刺通抵抗値が比較例2よりもかなり大きくなり、これより $l>0$  (HとCが重ならない形状)にしたほうが良いことが確認できた。また本発明の採血針1のメインペベルmとサイドペベルS1、S2により形成される分水嶺Jの高さDJ (刃先端PからJまでの高さ)のメインペベル\*

\* mの全高DB (刃先端PからHまでの高さ)に対する高さの割合を(DJ/DB×100)と刺通抵抗値の関係を表2に示した。表2の結果よりDJ/DB×100は50%以下に形成すると良いことがわかる。

[0010]

[表2]

刺通抵抗値(採血針)と分水嶺(J)の高さ(DJ)との関係

刺通抵抗値(g)		刃先P	分水嶺J	mの後縁H	糸管部
	Jの高さ(%)				
実施例2(採血針1)	57	88	243	135	25
実施例3(採血針1)	31	63	122	125	24
実施例4(採血針1)	22	72	93	147	23

(注) 採血針外径1.65ミリ

PVCシート(厚さ0.4ミリ;血管壁として想定)5か所穿刺の平均抵抗値(g)

[0011] また本発明の採血針1 (1) では $l$ を針の全体長Lの1/10から1/20に形成することにより血液流入量(単位時間あたりの採血速度)は流体学的に問題なく臨床実態的にも充分に確保できることが確認できた。

[0012]

**【発明の効果】** 本発明の採血針は穿刺しやすく採血者に与える苦痛を小さく抑えることができ、採血速度も充分に確保できるとともに血管の切開傷幅も小さいので切開傷の修復も速い。

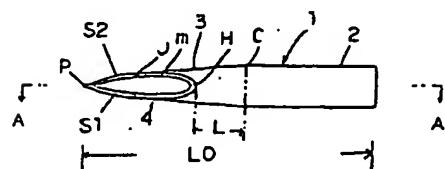
【図面の簡単な説明】

50 【図1】本発明の採血針の平面図

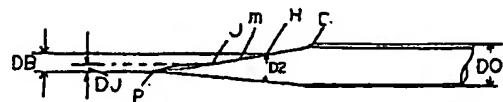
【図2】図1のA-A断面図  
 【図3】図1の採血針に加工する前の素管の概略図  
 【図4】本発明の採血針の平面図  
 【図5】図4のB-B断面図  
 【図6】図4の採血針に加工する前の素管の概略図  
 【図7】比較例1の採血針の平面図  
 【図8】図7のC-C断面図  
 【図9】各採血針の刺通抵抗値を示すグラフ  
 【図10】従来の採血針の平面図  
 【図11】図10のD-D断面図  
 【図12】従来の採血針による血管の切開傷の概略図  
 【符号の説明】  
 1、11、21、31 採血針  
 2、12、32 素管  
 3、13 細径の素管

4、14 刃面  
 D0 素管の外径  
 D1 素管の先端部の外径  
 D2、D3 Hの位置の細径の素管の径  
 S (S1、S2) サイドペベル  
 m メインペベル  
 J Sとmより形成される分水嶺  
 T 傾斜段  
 H mの後縁  
 C 傾斜開始点  
 L CとH間の距離  
 LO 針の全体長  
 DJ Jの高さ (PからJまでの高さ)  
 DB mの全高 (Pからmまでの高さ)  
 P 刃先端

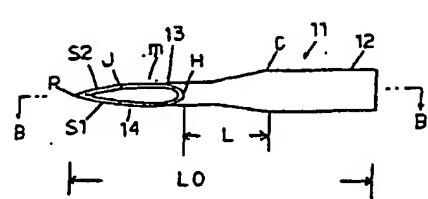
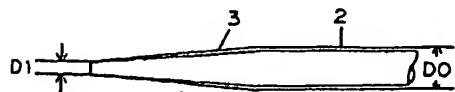
【図1】



【図2】

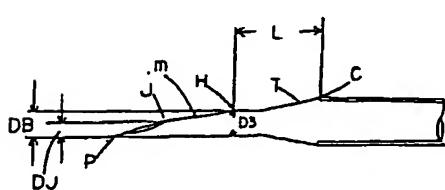


【図3】



【図12】

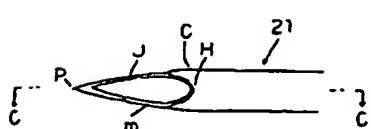
【図5】



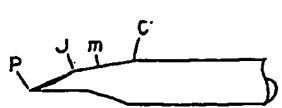
【図6】



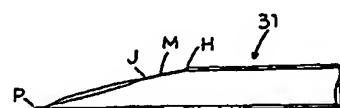
【図7】



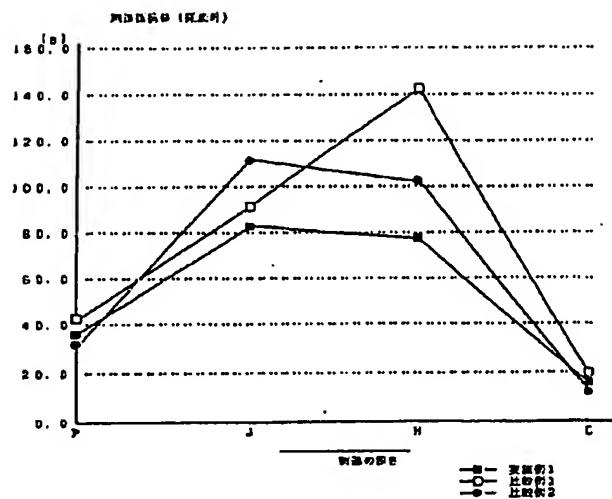
【図8】



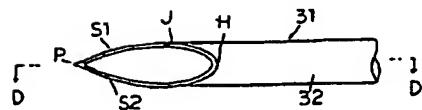
【図11】



[図9]



[図10]




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フロントページの続き

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